

What is claimed is:

1. A reticle set, comprising:

5 a first photomask having a circuit pattern provided with first and second openings provided adjacent to each other sandwiching a first opaque portion, and a monitor mark provided adjacent to the circuit pattern; and

10 a second photomask having a trim pattern provided with a second opaque portion configured to cover the first opaque portion in an area occupied by the circuit pattern and an extending portion connected to one end of the first opaque portion and configured to extend outside the area occupied by the circuit pattern when the second photomask is aligned with a pattern delineated on a substrate by the first photomask.

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2. The reticle set of claim 1, wherein phases of an exposure light transmitting through the first and second openings are shifted by 180 degrees from each other.

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3. The reticle set of claim 1, wherein a part of the monitor mark is provided at a corresponding position where another circuit pattern is to be delineated on the substrate in another exposure process.

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4. The reticle set of claim 1, wherein the monitor mark includes at least one of an exposure monitor mark configured to measure

an exposure condition of the first photomask and an inspection monitor mark for a photomask.

5 5. The reticle set of claim 1, wherein the exposure monitor mark includes at least one of a dimension monitor mark configured to monitor a dimension of a transferred pattern on the substrate, an exposure dose monitor mark configured to monitor an exposure dose, and an alignment mark configured to monitor a displacement of the transferred pattern.

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6. The reticle set of claim 1, wherein the inspection monitor mark includes at least one of a phase shift monitor mark configured to inspect a phase shift of a transmitting exposure light, a transmittance monitor mark configured to inspect transmittance of the exposure light, and a dimension monitor mark configured to inspect a dimension of a transferred pattern on the substrate.

7. A method for designing a reticle set, comprising:  
20 forming in a first photomask, a circuit pattern having first and second openings provided adjacent to each other sandwiching a first opaque portion, and a monitor mark adjacent to the circuit pattern; and

forming in a second photomask, a trim pattern having a  
25 second opaque portion configured to cover the first opaque portion in an area occupied by the circuit pattern and an

extending portion connected to one end of the first opaque  
portion and configured to extend outside the area occupied  
by the circuit pattern when the second photomask is aligned  
with a pattern delineated on a substrate by the first  
5 photomask.

8. The method of claim 7, wherein the monitor mark includes  
at least one of an exposure monitor mark configured to measure  
an exposure condition of the first photomask and an inspection  
10 monitor mark for a photomask.

9. The method of claim 8, wherein the exposure monitor mark  
includes at least one of a dimension monitor mark configured  
to monitor a dimension of a transferred pattern on the  
15 substrate, an exposure a dose monitor mark configured to  
monitor an exposure dose, and an alignment mark configured  
to monitor a displacement of the transferred pattern.

10. The method of claim 8, wherein the inspection monitor  
20 mark includes at least one of a phase shift monitor mark  
configured to inspect a phase shift of a transmitting exposure  
light, a transmittance monitor mark configured to inspect  
transmittance of the exposure light, and a dimension monitor  
mark configured to inspect a dimension of a transferred pattern  
25 on the substrate.

11. An exposure monitoring method, comprising:

delineating a wiring resist mask of a photoresist film by transferring a narrow line portion of a wiring of a circuit by a first exposure step;

5 delineating a monitor resist pattern of the photoresist film by transferring an exposure monitor mark configured to measure an exposure condition near the wiring resist mask at a position in an area where the wiring is to be delineated, the position being exposed by a second exposure step; and

10 measuring the exposure condition for the first exposure step by the monitor resist pattern.

12. The exposure monitoring method of claim 11 wherein the delineating of the monitor resist pattern includes  
15 development of the photoresist film.

13. The exposure monitoring method of claim 11, wherein the monitor resist pattern is a monitor resist latent image formed by exposing the photoresist film.

20 14. The exposure monitoring method of claim 11, wherein the exposure condition are measured from the monitor resist pattern formed by transferring at least one of a dimension monitor mark configured to monitor a dimension of a transferred  
25 pattern, an exposure dose monitor mark configured to monitor an exposure dose, and an alignment mark configured to monitor

a displacement of the transferred pattern.

15. An inspection method for a reticle set, comprising:

5 delineating a circuit pattern and an inspection monitor  
mark on a resist film coated on an opaque material film on  
a transparent substrate to form a resist mark;

10 etching the opaque material film by use of the resist mark  
to form a first photomask in which the circuit pattern has  
first and second openings provided adjacent to each other  
sandwiching a first opaque portion, and the inspection monitor  
mark provided adjacent to the circuit pattern; and

inspecting the first photomask by use of the inspection  
monitor mark.

15 16. The inspection method of claim 15, further comprising,  
placing the inspection monitor mark at such a position on  
the first photomask that an area where the inspection monitor  
mark is transferred on a substrate is exposed by a light through  
a second photomask.

20 17. The inspection method of claim 15, further comprising,  
performing the inspection of the first photomask using at  
least one of a phase shift monitor mark configured to inspect  
a phase shift of a transmitting exposure light, a transmittance  
25 monitor mark configured to inspect a transmittance of the  
exposure light, and a dimension monitor mark configured to

inspect a dimension of a transferred pattern on a substrate.

18. A manufacturing method for a semiconductor device, comprising:

5       coating a first photoresist film on an underlying film on a semiconductor substrate;

          transferring a circuit pattern having first and second openings provided adjacent to each other sandwiching a first opaque portion and a monitor mark adjacent to the circuit  
10       pattern onto the first photoresist film from a first photomask by a first exposure step so as to delineate a wiring resist mask and a monitor resist pattern;

          selectively removing the underlying film by using the wiring resist mask and the monitor resist pattern as a mask  
15       so as to delineate a narrow line portion of a wiring of a circuit and a monitor underlying film;

          coating a second photoresist film on the semiconductor substrate on which the narrow line portion and the monitor underlying film is formed;

20       delineating a trim resist mask by transferring a trim pattern from a second photomask onto the second photoresist film by a second exposure step, the trim pattern having a second opaque portion covering the first opaque portion in an area occupied by the circuit pattern, and an extending  
25       portion connected to one end of the first opaque portion and extending outside the area occupied by the circuit pattern;

and

delineating the wiring by selectively removing the monitor underlying film using the trim resist mask.

5 19. The manufacturing method of claim 18, further comprising:  
measuring an exposure condition for the first exposure step by using the monitor resist pattern.

10 20. The manufacturing method of claim 19, wherein the exposure condition is measured from the monitor resist pattern including at least one of a dimension monitor mark configured to monitor a dimension of a transferred pattern on the semiconductor substrate, an exposure dose monitor mark configured to monitor an exposure dose, and an alignment mark  
15 configured to monitor a displacement of the transferred pattern.

21. A manufacturing method for a semiconductor device, comprising:

20 coating a photoresist film on a underlying film on a semiconductor substrate;

transferring a circuit pattern having first and second openings provided adjacent to each other sandwiching a first opaque portion and a monitor mark provided adjacent to the  
25 circuit pattern onto the photoresist film from a first photomask by a first exposure step so as to delineate a wiring

resist latent image and a monitor resist latent image;

projecting a trim pattern by a second exposure step from  
a second photomask onto the photoresist film exposed by the  
first exposure step, the trim pattern having a second opaque  
5 portion covering the first opaque portion in an area occupied  
by the circuit pattern, and an extending portion connected  
to one end of the first opaque portion and extending outside  
the area occupied by the circuit pattern; and

delineating a wiring resist mask by a development process.

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22. The manufacturing method of claim 21, further comprising:

measuring an exposure condition for the first exposure  
step by using the monitor resist latent image.